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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,822	12/02/2003	Shean-Jeng Jong	JONG3013/EM	2818
23364	7590	07/27/2005	EXAMINER	
BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314			HU, HENRY S	
			ART UNIT	PAPER NUMBER
			1713	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,822

Applicant(s)

JONG ET AL.

Examiner

Henry S. Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on election with amendment of May 13, 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☒ Claim(s) 1 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. It is noted that Applicants' election with amendment filed on May 13, 2005 was received. The Applicants have elected **Claims 1-23 (Group I) without traverse**, while Claims 24-35 (Group II) are cancelled. **Claims 1-23 are now pending.** An action follows.

Specification

2. The disclosure is objected to because of the following informalities:
 - (a) On **page 6** at line 18, recitation of "1-dodecanthiol" should be changed to "**1-dodecanethiol**". The Applicants may refer to compound # 47136-4 in Aldrich chemical catalog for a correct wording.
 - (b) On **page 11** at line 16, phrase of "due to the absence of the dissolution agent, acetone" is better to change to "**due to the absence of the dissolution agent such as acetone**". Otherwise, it may be due to the absence of the dissolution agent and acetone.

Appropriate corrections for (a) and (b) are required.

Claim Objections

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3. Claim 1 and 21 are objected to because of the following informalities:

(a) On **Claim 1** at lines 12-13, the writing as "p and q separately represent an integer of more than 0, and $p+q = 1\sim 22$ " is improper. Since integers of p and q are each at least 1, the summation of p and q are thereby at least 2. Therefore, the Applicants may need to be changed to $p+q = 2\sim 22$.

(b) On **Claim 21** at line 2, recitation of "1-dodecanthiol" should be changed to "**1-dodecanethiol**". The Applicants may refer to compound # 47136-4 in Aldrich chemical catalog for a correct wording.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. The limitation of parent **Claim 1** in present invention relates to a method for preparing a water- and oil-repellent agent, which comprises conducting a copolymerization reaction of the following monomers i) to v) in a mixed solution of water and an organic dissolution agent by using a free radical initiator and in the presence of (A) an ionic surfactant, (B) a non-ionic surfactant, and (C) a chain transfer agent:

i) a perfluoroalkyl (meth)acrylate mixture with formula of $R^f-Q-O-C(=O)-CR^1=CH_2$; wherein R^1 is H or methyl, R^f is a perfluoro C₂₋₂₀ alkyl, and Q is $-(CH_2)_{p+q}$, $-(CH_2)-CONH-(CH_2)_q$, $-(CH_2)_p-OCO-NH(CH_2)_q$, $-(CH_2)_p-SO_2-NR^2-(CH_2)_q$, $-(CH_2)_p-NH-CO-NH-(CH_2)_q$ or $-(CH_2)_p-CH(OH)-(CH_2)_q$, wherein R^2 is H or C1-C4 alkyl, p and q separately represent an integer of more than 0, and $p+q = 1\sim 22$;

ii) C2-C20 alkyl (meth)acrylate;

iii) hydroxy C2-C6 alkyl (meth)acrylate;

iv) poly(oxy C2-C4 alkylene glycol mono(meth)acrylate having a number average molecular weight of 100-800;

v) C2-C4 alkene, fluoro- or chloro-containing C2-C4 alkene, or butadiene;

wherein the monomer ii) is of 10-70 wt %, the monomer iii) is of 0.5-7 wt %, the monomer iv) is of 0.1-40 wt %, the monomer v) is of 10-50 wt %, the free radical initiator is of 0.1-2 wt %, the water is of 100-400 wt %, the organic dissolution agent is of 40-200 wt %, the ionic surfactant is of 2-8 wt %, the non-ionic surfactant is of 8-30 wt %, and the chain transfer agent is of 0.1-2 wt %, based on the weight of the monomer i).

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See other limitations of dependent Claims 2-23.

6. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raiford et al. (EP 698,047 B1 or its equivalent US 5,344,903) in view of Shimada et al. (US 6,177,531 B1).

Regarding the limitation of parent **Claim 1, Raiford et al.** in each of EP and US patents **have disclosed the preparation of the claimed pentapolymer made from claimed five monomers (i) to (v)** (see working examples 1-10 and Table 1). Raiford further discloses that such obtained fluoropolymers will impart **oil- and water- repellency to fibrous substrates without heating above room temperature** (page 3, line 47-48). To be more specific, see page 5, line 52 – page 3, line 21 for using perfluoroalkylethyl (meth)acrylate as **monomer (i)**, see page 3, line 22-27 for using non-fluorinated alkyl (meth)acrylates as **monomer (ii)**, see page 3, line 27-28 for using hydroxy-alkyl (meth)acrylates as **monomer (iii)**, see page 3, line 29-37 for using a mixed poly(oxyalkylene/ethylene oxide) (meth)acrylates as **monomer (iv)**, and see page 3, line 38-40 for using vinylidene chloride as **monomer (v)**.

7. Although **water, an initiator, a surfactant and a chain transfer agent** are used together in making such a pentapolymers, the Raiford reference is silent about specifically **using a mixture of ionic surfactant and a nonionic surfactant along with some organic solvent (or called organic dissolution agent) being added into water**. Shimada has taught both of the required limitations to be used in the course of **emulsion copolymerization** when making a **water- and oil- repellent tetrapolymer** (abstract, line 1-11; columns 2-4; column 5, line 1-14).

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To be specific, see the use of a solvent mixture of water and an organic solvent such as ketone (column 5, line 10-27), and see the use of a mixture of non-ionic surfactant (such as Emulgen) and an ionic surfactant (such as stearyl trimethylammonium chloride) in working example 3 (column 7, line 14-17). By doing so, an water and oil repellent composition to be excellent in durability of water and oil repellency and durability of water resistance can be obtained (column 1, line 5 – column 2, line 5).

8. In light of the fact that both of the involved references are preparing similar type of fluorinated copolymers comprising the key component such as perfluoroalkyl (meth)acrylate (monomer (i)) and such obtained copolymers are used for the same application for water- and oil- repellent purpose, one having ordinary skill in the art would therefore have found it obvious to modify the composition by using a mixture of ionic surfactant and a nonionic surfactant along with some organic solvent being added into water as taught by Shimada. By this modification, one would expect to obtain a better and more diversified fluorinated copolymer with improved properties to be excellent in durability of water and oil repellency and durability of water resistance.

9. Regarding **Claim 2**, Raiford discloses that the reaction mixture in copolymerization is heated to 50 °C and held at 50 °C for 8 hours (page 4, line 44-45).

Regarding **Claims 3 and 4**, see the claimed monomers (i) and (ii) such as “perfluoroalkylethyl acrylate mixture A” and “stearyl methacrylate” (page 4, line 10-11).

Regarding **Claims 5, 6, and 7**, see the claimed monomers (iii), (iv) and (v) as well as working examples in the rejection of Claim 1.

Regarding **Claims 8 and 9**, the same water-soluble monomer (vi) such as **N-methylolacryl-amide or N-methylolmethacrylamide** is optionally used by Raiford (page 2, line 9-10 and 40-42; page 3, line 26-27).

Regarding **Claims 10 and 11**, the same water-soluble initiator such as **2,2'-azobis(2-amidinopropane) dihydrochloride** is used by Raiford (page 4, line 43-44).

Regarding organic solvent in **Claims 12-13 and 14-15**, **a solvent mixture of water and an organic solvent** such as **acetone or propylene glycol monomethyl ether** is taught by Shimada (column 5, line 10-27).

Regarding ionic surfactant in **Claims 16, 17 and 18**, the same water-soluble ionic surfactant such as **stearyl trimethylammonium chloride** is taught by Shimada (column 7, line 14-17).

Regarding **Claims 19 and 20**, many types of non-ionic surfactants are used. Shimada did not rule out the use of other derivatives of glycol as non-ionic surfactant to be mixed with ionic surfactant (column 5, line 16-21).

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Regarding **Claim 21**, the same chain transfer agent such as **1-dodecanethiol (or called dodecylmercaptan)** is used by Raiford (page 4, line 16 and 37).

Regarding **Claims 22 and 23**, such an average particle size **less than 200 nm** would be obtained since Raiford and/or Shimada use emulsion polymerization to prepare such a pentapolymer.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a method for preparing a water- and oil-repellent agent, which comprises conducting a free-radical induced copolymerization of five monomers as specified and in the presence of an ionic surfactant, a non-ionic surfactant, and a chain transfer agent:

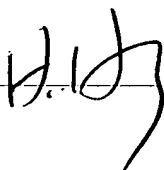
US Patent No. **6,121,372 to Yamamoto et al.** discloses the use of an aqueous emulsion for use as a water- and oil-repellent agent, wherein aqueous emulsion is produced by copolymerization of at least one lower alkyl methacrylate (monomer (ii)), benzyl (meth)acrylate and vinylidene chloride (monomer (v)) with a polyfluoroalkyl group-containing (meth)acrylate ester (monomer (i)) (abstract, line 1-5). Although monomer (vi) such as **N-methylolmethacrylamide** may be used (column 3, line 25-30), monomer (iii) or monomer (iv) is not disclosed or

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suggested in the composition of copolymer. Therefore, Yamamoto fails to teach or fairly suggest the limitation of present invention.

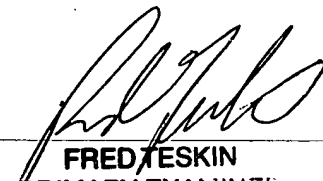
11. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Dr. Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Henry S. Hu

Patent Examiner, Art Unit 1713, USPTO

July 25, 2005


FRED TESKIN
PRIMARY EXAMINER
